

A marked-up version of the claim appears in an appendix to this Amendment and Response.

Please add the following claims.

76. (New) A method of passivating a multilayer conductive structure, comprising:

layering a first conductive material;
introducing N₂ gas to said first conductive material;
releasing nitrogen from said gas with electromagnetic energy; and
layering a second conductive material over said first conductive material.

~~77. (New) A method of passivating a multilayer conductive structure, comprising:~~

~~layering a first conductive material;
introducing NH₃ gas to said first conductive material;
releasing nitrogen from said gas with electromagnetic energy; and
layering a second conductive material over said first conductive material.~~

REMARKS

Claims 43-44 were pending up to this Amendment and Response.

Claims 43-44 were rejected.

Claim 43 is amended.

Claims 76-77 are added.

Claims 43-44 and 76-77 are pending as of this Amendment and Response.

I. Rejection under §112 for lack of enablement.

The Examiner rejected claims 43 and 44 for lack of enablement. Applicant contends that such a rejection stems from a misinterpretation of the limitation originally in claim 43 concerning "a selection" of three gases. In order to clarify the claimed invention, Applicant has amended claim

43 and added claims 76 and 77. Claim 43 now requires an act of introducing N₂/H₂ gas; claim 76 requires an act of introducing N₂ gas; and claim 77 requires an act of introducing NH₃ gas. Applicant contends that these claims are enabled by the specification yet not limited to the embodiments described therein.

II. Rejection under §103 for obviousness.

The Examiner rejected claims 43-44 as being obvious in light of Suehiro (U.S. Patent No. 5,719,410) in combination with Yamazaki (U.S. Patent No. 5,970,384). Applicant contends that (1) flaws in the Examiner's argument result in a failure to meet the prima facie burden required for an obviousness rejection and that (2) a proper consideration of the references discourages their combination.

A. Flaws in the Examiner's argument

One flaw in the Examiner's argument stems from a misinterpretation of the language relied upon in Suehiro. The Examiner interprets Suehiro as disclosing releasing nitrogen from a particular gas, citing column 7, lines 61-62 of the reference. (Office Action of 12/14/00 at 3.) However, that portion of Suehiro reads as follows:

While said part of the *nitrogen in the film 4* moves into the film 3, thus forming the silicon nitride film 6, the remaining *nitrogen in the film 4* diffuses outwards from the film 4.

(Emphasis added.) Thus, the portion of Suehiro relied upon by the Examiner does *not* disclose releasing nitrogen from a gas, as the Examiner believes. Rather, that portion teaches releasing nitrogen from a particular film – a solid material – not a gas.

Another flaw in the Examiner's argument stems from an erroneous assumption concerning the motivation of one of ordinary skill in the art. Specifically, the Examiner indicated that it would be obvious to apply Yamazaki's UV irradiation step to Suehiro's device because one would wish to reduce the amount of carbon and hydrogen in that device. (Office Action of 12/14/00 at 3.) It is significant, however, that Suehiro is replete with teachings for deliberately incorporating and

maintaining carbon in devices. (Suehiro at col. 4, ln. 29-39 (summarizing the sixth aspect of the invention); col. 4, ln. 40-53 (summarizing the seventh aspect of the invention); col. 6, ln. 1-16; col. 17, ln. 20 – col. 20 ln. 39 and figs. 15A-H (teaching an eighth embodiment of the invention); col. 20, ln. 40 – col. 22 ln. 44 and figs. 16A-E (teaching a ninth embodiment of the invention); claim 3-7.) Moreover, Suehiro teaches exposing its device to a hydrogen atmosphere. (*Id.* at col. 7, ln. 45-50 (specifying an atmosphere of hydrogen as well as an atmosphere of hydrogen combined with other elements).) Thus, one cannot infer a motivation to reduce carbon and hydrogen from Suehiro's device given that Suehiro actively teaches that hydrogen and carbon are preferable elements for its device.

Thus, the flaws in interpreting Suehiro and in articulating a motivation to combine the references result in a failure to meet the *prima facie* burden required to reject the claims as being obvious. Accordingly, Applicant requests that the rejection be withdrawn.

B. Factors discouraging combination of the references

Further, Suehiro's teachings concerning the allowance of hydrogen and the encouragement of carbon in its device not only demonstrate the flaws in the Examiner's reasoning but also serve as an example of but one of the contrary teachings between the two references. Such contrary teachings discourage combination. Specifically, the above-cited teachings in Suehiro concerning the allowance of hydrogen and the encouragement of carbon in a device are in direct conflict with Yamazaki, which touts the benefits of reducing carbon and hydrogen in films (Yamazaki at col. 2, ln. 17-30 (characterizing a high concentration of hydrogen in a film as problematic); col. 2, ln. 61 – col. 3 ln. 3 (characterizing a high concentration of carbon in a film as problematic); col. 8, ln. 66 – col. 9, ln. 9 (reiterating the problems associated with carbon in the film and teaching the removal of carbon); col. 39, ln. 22-30 (teaching reducing the carbon and hydrogen concentrations in the film); col. 39, ln. 31-45 (describing the reduction in concentration of hydrogen in a film as an improvement)).

Moreover, the references differ on a more general and fundamental level. Suehiro is devoted to forming an electrically *conductive* structure, such as a transistor gate or contact. Accordingly, Suehiro expressly seeks to address problems associated with such structures, such as

the RC delay. Yamazaki, on the other hand, focuses on electrically *insulative* layers, such as a gate oxide and, more specifically, silicon oxide films. As a result, Yamazaki expressly emphasizes the problems and solutions associated with that type of structure, such as leakage current. Further, the Examiner has not cited any portion of text indicating that the solution in one reference would have an effect on the material of opposing nature in the other reference. Thus, given (1) the inherent conflicts in the nature of the references' workpiece materials and (2) the focus of the references on the problems associated with those particular materials, one of ordinary skill in the art would not only lack motivation to combine but would be actively discouraged from combining them.

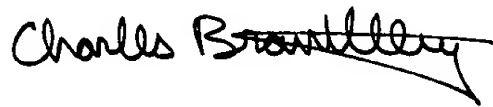
Further, the focus on each reference to materials of an opposing electrical nature gives rise to still other conflicts that discourage combination. For instance, although Yamazaki focuses on a gate oxide, the reference does briefly mention a transistor gate. Yamazaki teaches that the gate is primarily a single material -- aluminum (*e.g.*, Yamazaki at col. 14, ln. 38-39). While acknowledging that it may contain a small percentage of other materials (*Id.*), the amount of the single material is so overwhelming that Yamazaki indicates that the gate can be accurately referred to as an "aluminum gate" (*Id.* at ln. 45). (*See also Id.* at figs. 7C, 7D, and 7E (illustrating a transistor gate made of a single layer).) As such, Yamazaki's gate is analogous to the single-layer gate suggested in the background section of Suehiro; Suehiro's background section further teaches that, even in the prior art, such a structure had been rejected in favor of a gate having two discrete layers. (Suehiro at col. 1, ln. 31-46.) (*Id.* at fig. 1D.) Suehiro's invention extrapolates from this two-layer concept by adding yet a third layer to the gate stack. Thus, one of ordinary skill in the art would not be motivated to modify Suehiro's gate stack by looking to a reference that contains teachings that are not only rejected by Suehiro's invention but have also been rejected by Suehiro's prior art.

Thus, the teachings of Suehiro and Yamazaki conflict in both general subject matter and in the specifics relevant to the current claims. As a result, not only has the Examiner failed to meet the *prima facie* burden for rejection, Applicant contends that the Examiner will not be able to meet that burden because the references teach away from each other. This provides yet another basis for withdrawing the rejection.

CONCLUSION

In light of the above amendments and remarks, Applicant submits that claims 43-44 are enabled and allowable over the applied references. Therefore, Applicant respectfully requests reconsideration of the Examiner's rejections and further requests allowance of all of the pending claims. If there are any matters which may be resolved or clarified through a telephone interview, the Examiner is requested to contact Applicant's undersigned attorney at the number indicated.

Respectfully submitted,



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Appendix: Marked-up version of claims

43. (Once amended) A method of passivating a multilayer conductive structure, comprising:
- layering a first conductive material;
 - introducing [a selection of] N_2/H_2 [, N_2 , and NH_3] gas to said first conductive material;
 - releasing nitrogen from said gas with electromagnetic energy; and
 - layering a second conductive material over said first conductive material.